IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Thomas E. Rajewski

CUSTOMER NO.: 26645

Serial No.: 10/529,955

Docket No.: 3187-01

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Examiner: GOLOGOY, James C.

Art Unit: 1797

For: A LUBRICANT USEFUL FOR IMPROVING THE OIL SEPARATION PERFORMANCE OF A VAPOR COMPRESSION SYSTEM

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AFFIDAVIT OF KENNETH CARL LILJE

I, KENNETH CARL LILJE, of 3896 East Monroe Rd., Midland, MI 48642, do hereby declare as follows:

I hold the degree of Bachelor of Science in Chemistry awarded by the Capital University, Columbus, Ohio in 1970 and the degree of Doctor of Philosophy, Organic Chemistry, awarded by the University of Cincinnati, Cincinnati, Ohio in 1976. I had a Post-doctoral Research Fellowship at The Ohio State University, Columbus, Ohio from 1976-1979. I was employed by Ethyl Corporation (Albemarle Corporation) in Baton Rouge, Louisiana from 1979 through 1995 with increasing responsibilities from entry level up to Research Manager. While at Ethyl Corporation, I was Research Manager from 1989 to 1995 where group projects included R&D on synthetic hydrocarbons, novel esters and novel performance additives. I also worked on new product development. I joined CPI Engineering Services, Inc./Lubrizol Corporation, Midland, Michigan in 1995; and currently work there as Director of Research and Development. While at CPI Engineering Services, Inc., I have worked in the area of formulation of fully formulated compressor lubricants (all gases, including air, refrigerants, hydrocarbons and reactive gases) for ca. 15 years. My publications related to lubricants and lubrication include 16 publications including Handbook and Reference Book chapters on Compressors and Lubricants as well as peer reviewed articles/papers; 7 US patents; and 13 presentations on compressor lubricants and their formulation to meet performance requirements.

I am a co- inventor of USSN 10/529,955;

I am fully familiar with the prosecution history relating to the present application and am fully conversant with the Examiner's objections as set forth in the office communications including the most recent rejection mailed May 27, 2010.

Compressors are used in a wide variety of applications to compress a wide variety of gasses. Most compressors run for long time intervals and the operating temperature is controlled by the design parameters of the system. The temperature variation in use is very small. These operating parameters define the "needs" of the lubricant. When formulating compressor lubricants, the kinematic viscosity of the lubricant is picked to provide the working viscosity needed to lubricate the bearing under operating conditions. Because of these tight restraints, compressor lubricants are always a "single" viscosity grade.

Viscosity modifiers (eg., Viscosity Index Improvers) are typically added to lubricant formulations in order to reduce the temperature dependence on the viscosity of the base oils. This allows the formulator to prepare "multigrade lubricants". These types of lubricants are particularly important and necessary to provide adequate lubrication over a very wide temperature range (from well below 32°F to well over 200°F). The best example of lubricants that require VII is motor oil products. The VII additives in these products enable the lubricant to have viscosity low enough to enable cold engine starts at extreme low winter temperature while still having enough viscosity to provide the required viscosity at the highest operating temperatures in the "hot extremes" of summer.

CPI Engineering has been formulating compressor oils for over 30 years (I have personally been involved in formulating these products for the past 15 years). They are the core product line offered by the company. We have lubricants specifically designed for compressors of all types with all gases (over 700 products). We work closely with the major compressor OEMs to design lubricants to meet the specific needs of specific systems. Because of the controlled

environment and operating parameters required by this market, multigrade lubricants are neither needed nor desired. There is no "technical need" for the properties that multigrade oils provide. We have never evaluated nor provided a multigrade lubricant product into this industry. It is not obvious to one skilled in the art to use VII improvers in compressor lubricant formulations because historically they provide no technically needed performance to this type of lubricant.

I am aware that some compressor patents have boilerplate language that specifies viscosity modifiers may be used in compressor oils. Those skilled in the compressor lubrication art, like myself, understand that most gas compressors work over a very limited operating temperature range (as stated above) and therefore viscosity index modifiers serve no commercially significant purpose in gas compressor oils.

There has been a long felt need in the gas compressor art for a way to reduce oil misting losses from compressors and minimize or eliminate contamination of compressed gases with oil. The solution for the misting problem for decades has been limited to costly separators to condense and remove the oil after the mist is formed. Similar polymers, called viscosity index modifiers, to our currently claimed polymers have existed and been used in engine oils for decades, while the problem of oil misting in gas compressors continued to plague manufacturers and users of gas compressors. Expensive filters and coalescers have been built into oil separators for small and large gas compressors. The oil separators reduce gas flow from the compressor or reduce the pressure of the output gas, or often reduce both. These reductions in gas flow and/or pressure reduce the energy efficiency of compressors. The oil separators also require routine shutdown and maintenance. I feel the long felt need and commercial benefit for these anti-misting polymers in gas compressor technology (an industry with some very good scientists, engineers, and technological advances) is very contradictory to the alleged obviousness of combining the claimed anti-misting agents with conventional compressor oils. Copending WO2004/030792 written by a compressor manufacturer details in the abstract how an oil with reduced misting can by reducing the amount of small particle size mist reduce the need for a coalescer portion of the oil separator.

I feel the invention of US 10/539,955 is novel over prior publications cited by the Examiner. I feel that one skilled in the art, such as myself, would not be motivated by the references cited by the Examiner to combine the elements to form the claims of US 10/539,955 with a reasonable probability of making 1) an improved oil for a gas compressor or 2) an oil for a gas compressor that had reduced oil misting due to the addition of a viscosity index modifier.

I am signing this document of my own free will and attest to the complete truthfulness and accuracy of the statements made herein, understanding that false or misleading statements can be used against me both criminally and to invalidate this patent if granted.

Signed at Midland, Michigan, this 23rd day of November, 2010.

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Kenneth Carl Lilje